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### THE NEW YORK AQUARIUM.

For over two years work has been going on to transform Castle Garden into a public aquarium. This famous old place was for years used as the landing depot for emigrants entering the port of New York.

On February 16th an appointed committee of three scientists and several invited experts inspected the aquarium, the mechanical part of which is about finished. The occasion for this inspection was the retiring of the old Park Board. We were among the invited. The exterior of the old "Castle" has been, save some necessary repairs and painting, left as it was in olden times. The old heavy oaken door, studded with heavy iron rivets, has also undergone some repairs, and is put into use again. Entering through this, we pass by what used to be the guard-rooms, and arrive in a large open circular space that reminds us of a circus. In the centre of this, sunk a couple of feet deep and raised as many above the ground, is a large circular basin; this is surrounded by six kidney-shaped smaller ones. These basins will serve to harbor aquatic reptiles and mammals. They are built of brick and cement,

have sandstone coping and are faced inside with white glazed tiles, and outside with tiles Venetian red in color. The entire floor of the rotunda is covered with tile-mosaics of a cheerful pattern. Around these basins, on the floor, and also about half way between the roof and the floor, are a number of steam heaters; those on the floor are appropriately covered with perforated brass screens of antique pattern. The woodwork that supports the roof, and that of the gallery, which encircles the entire space at a height of about twelve feet, is painted pea-green. The light for the entire building, as well as for the tanks, enters through a number of windows in the roof.

Directly opposite of the entrance is the pump-room, which contains the engine and pumps that supply the water for the tanks and basins. This room divides the circle in two sections, of which the one to our left will be the marine, while that to our right is set aside for the fresh water section. Each of these sections have two rows of tanks, one on the main floor and the other on the gallery—those on the main floor, fifty-six in number, being the largest. The glass of these measure in some



seven by five and in others five by five feet; two of these in each section open into one another, thus forming a double tank of eleven and a half by five feet. The glass of the tanks on the gallery, numbering thirty-six in all, is three feet wide by three and one-half feet high in some, while it is five feet by three and one-half in others. These sizes are also the measurements of the tanks inside; no allowance has been made for rustic decoration. Their depth is two feet nine inches, from the glass to the back wall (inside measure). The main floor tanks are built of cement and brick; those on the gallery are made of slate. The two sides and the back walls of all the tanks are lined with white glazed tiles. The bottoms are of slate or cement. Cast-iron frames, of the conventional picture-frame shape, hold the plate glass fronts in place; they have no sills. The supply pipes that come in contact with sea-water are of hard rubber.

All the material used in the construction of the aquarium is of the best quality, and the workmanship is excellent; but with the technical part they have not been so successful, as they have adopted the unscientific method which was abandoned more than twenty-five years ago in Europe, *i. e.*, to supply the tanks with a continuous flow of "new" water—from the Bay for the marine section, and from the city water works for the fresh water specimens.

In the European aquariums the reservoir system is used, which has been found most thoroughly satisfactory, and besides, is more economical. This system requires three times the volume of water the tanks contain when full; one part being in the tanks in use, so to say, while the two others are in the

storage tanks at rest. From here it circulates. It is forced into the show-tanks by a comparatively small pump, being re-charged with oxygen as it enters these.

This system, in addition, enables to supply to the specimens the different densities of "seasoned" sea-water, and also allows control of the temperature of same.

The utter weakness of the old system was quite apparent during our visit, for the Bay being full of ice, the temperature of the water in the tanks was down almost to freezing. To keep tropical fishes or plants in such water is out of the question. But this might easily be corrected, as there is a cellar under the old guard-room where storage tanks might be placed. Not quite so easy, however, would it be to reconstruct some of the tanks in order to give greater depth to them, or to otherwise change their shape to enable effective decorations to show the peculiar characteristics of the different specimens.

#### CHARMS OF THE LILY POND.

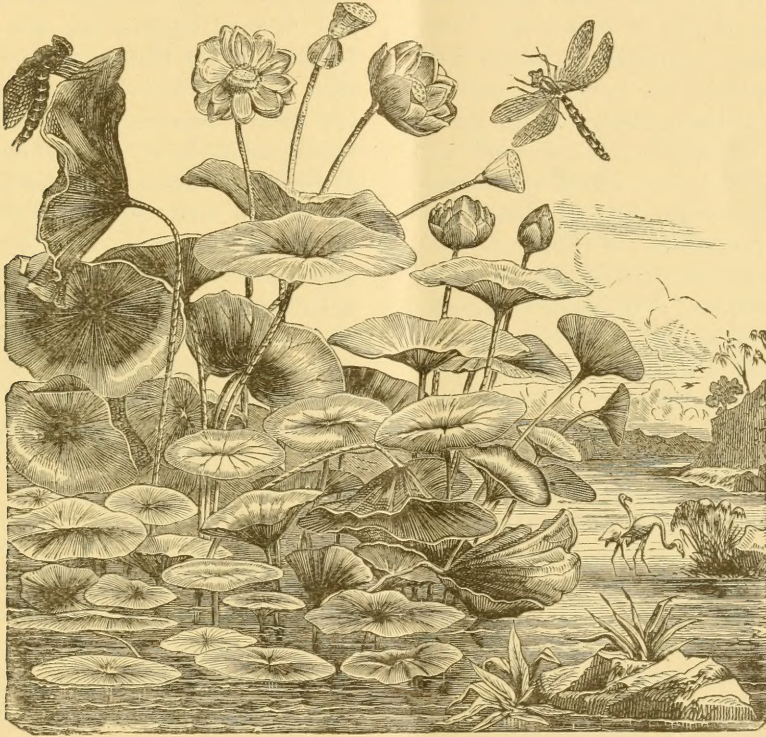
A casual glance at a lily pond reveals two well-defined characteristics: Plants with foliage and flowers standing far above the water, and those with their leaves and pads afloat on its surface. Chief among the first class is the *Lotus*, whose grandeur and beauty defy alike the powers of the pen and the brush. Its massive pea-green foliage of peltate leaves, resembling inverted umbrellas, stands six to eight feet above the water, each with a fairy lakelet of molten silver dreaming in its bosom. Surmounting the wilderness of green, the individual flowers arise like the gorgeous banners of the Orient.

Representing the second class is the



*Water Lily proper*, with its cordate and bronze-green foliage, interspersed with thousands of red, white and yellow blooms, either resting on the water or peeping like white kittens from the masses of tender foliage. Intermediate between these and the Lotus, *Nymphæa superba* asserts imperial supremacy, its

pencil stains, with their red, white and blue flowers rising several inches above, to display their exotic riches. But chief among them, and undisputed mistresses of the floral kingdom, are the Victorias, with their enormous variable flowers, rocking and blushing on the gentle waves like veritable Ama-



EGYPTIAN LOTUS AT HOME.

foliage either vibrating a foot in the air or floating on the water like giant pie-pans, with its huge flowers, here like hemispheres of snow, launching their fairy canoe petals on the water, or there assuming a spherical form and reaching up above the tallest leaves, as if to clasp hands with the lordly Lotus.

Now we pass to the tender varieties, with their gently ruffled leaves, lying so flat on the water as to appear like

zons, and their gigantic leaves with upturned edges, any of which is large enough to sustain a miniature aquatic garden.

But a general view of the pond does not satisfy our longings. We draw nearer to touch and embrace, to acquaint ourselves with their singular habit. The leaves of the Lotus are strong and flexible. Water thrown against them does not adhere, but glances off instantly. The uprights



will hold a pint or more of water, and when overloaded the stems deflect, turning the water out, and at once resume their normal position. During a shower they may be heard pouring out their great bowls of water in every direction. The foliage of the *Nymphæas* is more flimsy, the surface appearing clammy or oily, and water poured on the leaves trickles off reluctantly. The root formations are equally varied. The smooth tuber of the *Lotus*, the nut-like offshoots of *Devoniensis*, and the thick, creeping rhizomes of *Candidissima* are quite unlike, and afford interesting study. But while the foliage and roots show such a diversity of forms, the flowers of all are wonderfully alike in their general outline. The petals of all are keel or canoe-shaped, which enables them to ride the waves in a most novel and suggestive manner. The stamens are numerous, filiform, and quiver above the pistil with every motion of the flower. The petals of the *Lotus* are deciduous; those of all other species are persistent. The whole family of day bloomers open early in the morning and close in the afternoon. The night bloomers open about 8 o'clock in the evening and close about 10 o'clock in the morning. The flowers of the *Pontederias* and *Limncharis* last but one day; those of the *Victorias* two days, and change from pure white to dark red. The *Lotus* opens four days, and fades from red or yellow to almost white. The *Nymphæas* last from three to six days, according to the condition of the weather. The seeds of the *Lotus* ripen far above the water, in a torus resembling an inverted cone. The *Nymphæas* close their petals firmly and drop beneath the water to ripen their seed, while *N. superba* and some few others curiously draw their

seeds pods into the mud by a spiral coiling of the flower stem.

Now, let us add the living reality to the scene. Swarms of bees, butterflies and humming birds, regaling themselves on the exuding nectar; birds bathing in the water and sipping from the dainty lakelets on the foliage; the huge green frog basking his uncouth and bloated ugliness on the floating leaves—and the picture is still incomplete! For, true to its placid beauty, the water intensifies the scene by portraying all these by inverted images, as if their antipodes had pierced the earth and offered their counterpart to glorify the American scene. Then we have it complete—the panorama that seizes alike the wonderment of the old foggy, who never sees the finest flowers and shrubbery of the yard and lawn, the admiration and praise of every lover of flowers, and makes a lasting impression upon the mind of every visitor and passer-by.

#### CULTURAL NOTES.

The cultivation of all Water Lilies is nearly identical and very simple. The best soil for growing them is rich, heavy loam. Rich garden soil or mud from the bed of a pond or stream supplies their wants exactly.

To grow in tubs.—Fill the tubs two-thirds full of the above-named soil. Plant the roots by laying them in *horizontally* near the edge, with the bud pointing towards the center of the tub, and barely cover them. Now fill the tub with water, and keep full; in winter keep from freezing.

To grow in tanks or cement basins is almost the same as for tubs. If preferred, the Lilies can be planted in boxes and sunk in the water without



putting soil in the bottom of the tank. Roots and young plants should not be placed in water more than a foot deep until they have taken a good start to grow. Nothing should be planted in new tanks while the water is strong of the cement. Protection during winter, to keep the plaster from freezing and falling off, may be done in several ways, optional with the owner, but the best plan is to cover the tank over with glass. This, of course, is not essential, but with the assistance of a large lamp or small oil stove, one is well repaid by having flowers all winter.

To grow in ponds or streams.—Plant as soon as the danger of frost is over, where the water is a foot deep, lay the roots horizontally, and cover them with two or three inches of soil. If the pond is subject to overflows, it is best to plant all in boxes, so that they can be moved into shallow water until the plants become established, then they will care for themselves. Water Lilies will not thrive in soil where rock or sand is too abundant.—*From* GEO. B. MOULDER'S *Catalogue*.

#### AMERICAN BLACK BASS AND SUNFISH IN FINLAND.

We read in the "Deutsche Fischerei Zeitung" that our famous black bass, both species, have been successfully shipped to the cold and distant northern country, Finland. We are greatly interested in the result. Finland is abundantly supplied with exceedingly fine flavored fish and fish-culture is well understood there. In its native home, the Ohio valley and the lower Lake region, the black bass is exposed to long and rather warm summers; in Finland the climate is just the reverse.

Von dem Borne's establishment (see October, 1894, issue of the AQUARIUM), supplied the fish mentioned above from its ponds. Nine hundred and fifty, one summer's crop of the big-mouthed species or Oswego bass (*M. Salmoides*), comprised the first shipment, and a second contained two hundred of the small-mouth or Moss bass (*M. Dolomiei*) of same age. These fish were shipped to Helsingfors. Of the big-mouths, which were shipped in the middle of October, only one single fish was lost. The trip lasting nine days, this certainly was an excellent result. The second shipment bearing the small-mouths was not so successful. Out of the two hundred and ten fish shipped one hundred and thirty-two fish died on the way. The remarkable difference in the result of the two shipments is found in the mistake made in filling the shipping cans too full of water, which prevented the water being aerated by its motion (*splashing* against the shoulders of the shipping cans.) (See "The Goldfish and Its Culture," p. 78; German Edition, p. 75.) The proof of this was found in the fact that in one can all the fish were lost; in another, of seventy-three, fifty-nine were dead; and in the third, in which the proper space had been left, not one fish was lost. Each can contained the same number of fish when they started.

Eight American pumpkin seed sunfish were also sent in a separate can; of these two died during the trip.

"Folks that live in the city can't write po'try—not the real, genuine article. To write po'try, as I figure it, the heart must hev somethin' to feed on; you can't get that somethin' whar there ain't trees 'nd grass 'nd birds 'nd flowers."—*Eugene Field*.



PROTECTION TO ORIGINATORS  
OF NEW FLOWERS AND  
FRUITS AND VEGETABLES.

There is another and important work for the department to do, at least for the government to do, viz.: To protect the originator of a new variety of fruit, vegetable or flower, in order that he may have the benefit of his study and labor in producing it.

A man can get a simple device patented, and for twenty years get a royalty on every one sold. The same is true with books; the writer gets his price on every copy sold, just according to his popularity. Why should not the specialist in plants be protected in the same way? In many instances several years' labor is expended in the development of a variety, and the originator will get for the same a bonus for the stock. After that it is the common property of all. Why should there not be the same property rights in a rose there is in a rat trap?

This matter is of more importance than appears at first thinking. The moment a specialist feels that his labors will be awarded by the protection the government gives him, the same as the inventor has, his energies will be awakened, he will make extra efforts to produce something of value, because he can make something from it. The result will be, we shall have more new and valuable varieties than at present. More than that, Peter's Prolific pea cannot be sold as such without Peter's consent, which will have much to do in keeping sorts true to name and quality. Every dealer can have his own "First and Best," but he has no right to another's "First and Best" without paying for it. A trade-mark should

protect seeds, bulbs, vegetables and flowers, just as much as any other article of merchandise, and that without the necessity of putting a label on each packet. Then when a man establishes a reputation it will avail him something. —*Florists' Exchange*, March 2, 1895.

We fully agree with the *Florists' Exchange*. Last summer we had an experience that illustrates how disagreeable and hurtful the present state of affairs can be. To a customer abroad, we had sold seeds of some of our new hybrid aquarium plants. Being anxious to learn of the result in a different climate we addressed a letter of inquiry to that effect and received as answer: that one variety had been an entire failure, while the other turned out to be a very common species, native all over Northern Europe, etc.

Last summer, while abroad, we surprised the establishment in question with a personal visit quite early in the morning and recognized "our children" at first sight. They had come true to name and were in excellent condition. Asked to explain his letter, our friend(?) excused himself with the phrase, that he had lost the packages bearing the names of the seeds and had forgotten whence they came. He had given "our product" different names and introduced them as his own.

It may here be added that, to produce one of the varieties, it required eight years of close watching and care to have the two parent plants in bloom at the same time in order to fertilize them successfully.

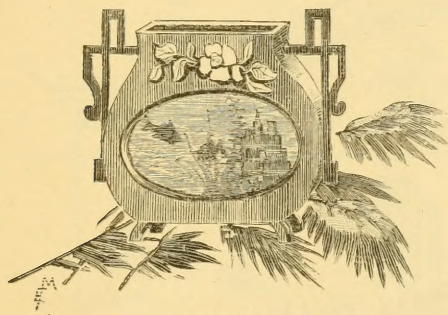
Ornamented palm-pots have made their appearance in the market. They are deeper than the old style, made of white clay, and the saucers are glazed to prevent the moisture from soaking through.



## SHAPES OF AQUARIUMS.

Any kind of a vessel that holds water and the material of which does not affect the water, may be used to harbor a collection of aquatic plants and animals.

For the cultivation of water lilies, or other water plants, whose beautiful flowers or leaves are the principal points of attraction, or for the keeping of turtles, wooden tubs meet all the requirements. But when one wishes to keep fish in order to enjoy their graceful motions or study their shapes and habits, a vessel that admits a view from the side, a transparent glass vessel, is



FAIENCE AQUARIUM.

necessary. Fishes must be seen as they see one another, not from the top, as such a view gives an incorrect idea of the fish. Think how different a person looks when seen from a fourth or fifth story window on the sidewalk, and when one meets the same person on the same level, or meets him in his own house where he is perfectly at ease. We find just as much difference in fish when kept in lakes and fountain basins as in glass-sided aquariums.

The old-fashioned fish globe has seen its day; they are still manufactured, to be sure, but the manufacturers have greatly improved on them. The shape of the new globe, the so-called "new pattern globe," is not quite so round as

the former ones, being more in shape of a Japanese jardiniere, the widest part being near the top. They are a decided improvement on the old style, and fill the bill, as a cheap round aquarium intended for decoration, very well.

For observation and study the sides must be straight. Our pictures illustrate some very attractive patterns for window decoration, or for a small table.

Next to these come the plain rectangular tanks. These may be made all of one piece of glass, shaped in a form while in a soft state, or they may consist of a metal frame, into which the bottom and side and end glasses are cemented. The latter ones have the advantage that when a glass breaks, it can be replaced by a new one, which cannot be done when the tank is made of one piece only.

On page 107 we gave instructions how such tanks may be made with a small outlay, out of angle iron, but for those who prefer to buy ready-made ones, or fitted frames without the glass, we have some on hand. We make them in two sizes at present, viz.:  $11\frac{1}{2}$  inches high,  $7\frac{1}{2}$  inches wide, and  $14\frac{1}{2}$  inches long. The dimensions of the second size are the same, with the exception of the length, which is 21 inches, all inside measures. They are perfectly plain tanks, made of the very best material, however, and just the thing for laboratories, schools, kindergartens, etc. The exterior of such a tank can easily be ornamented with wooden moulding to suit one's fancy. One of our illustrations shows one, of a large pattern in this case, that is decorated with fluted pillars and otherwise trimmed to form a design somewhat Greek in appearance. The wood is stained a dull black, to represent antique iron, and the smaller borders are kept in a shiny,



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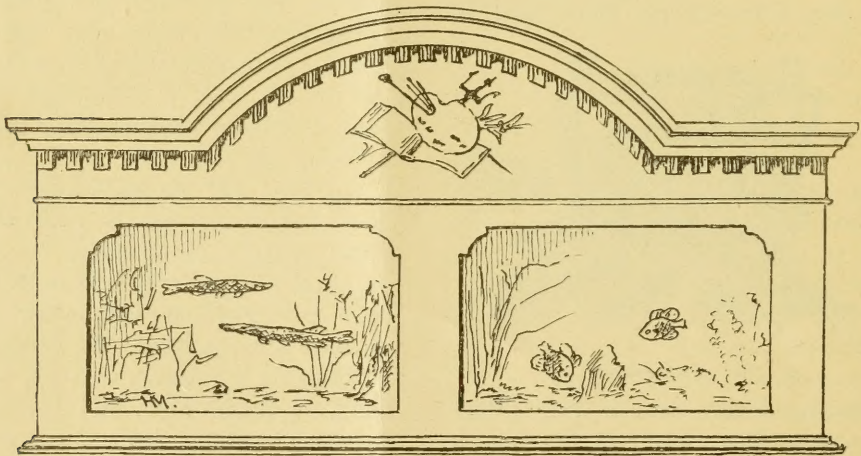
HUGO MULERTT, F. I. R. S. A.,  
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creamy white, to represent old ivory. The effect of the whole is very pleasing. The stand on which it rests forms an antique oaken cabinet.

Two of the above mentioned smaller sized tanks might be used on one win-

The 21-inch size is a good shape for a breeding tank. When one wishes to raise some young Paradise or gold-fish, or for breeding sticklebacks, its length permits dividing it in two or more apartments by simply placing one or more panes of glass between the sides.

The window sill aquarium, represented in another illustration, it will be observed, is rather long compared with its width and height; it is designed for an ordinary window sill. The dimensions, 30 inches in length, 12 inches in height, and 10 inches in width, experience has taught us to be



TWIN AQUARIUM.

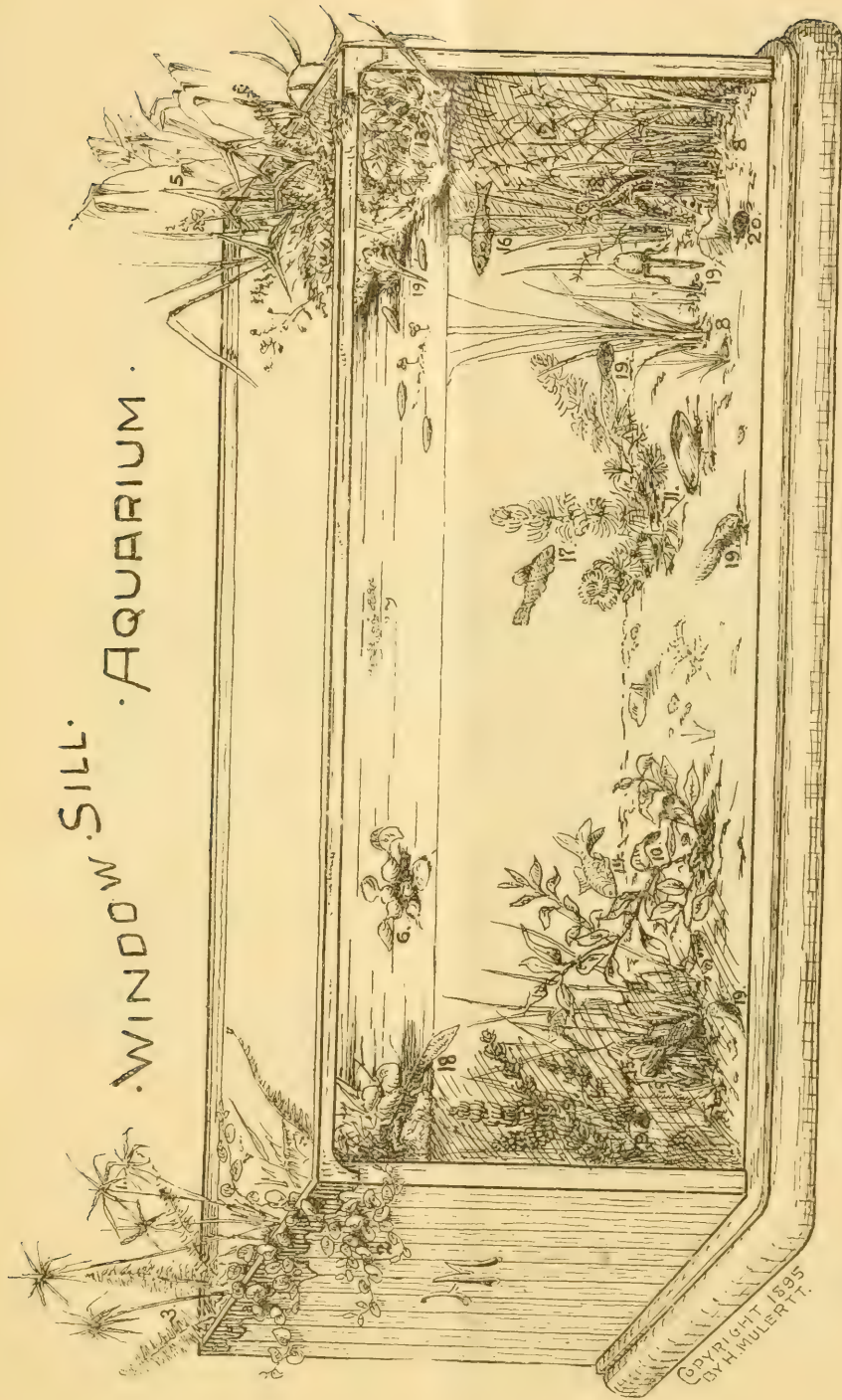
dow-sill; they would then form a twin aquarium. (See illustration.) The advantages of such a screened twin aquarium are very important, especially in kindergartens. Each tank can be stocked with different objects; each one can be changed and rearranged without molesting the other; both are protected by an ornamented front, which hangs on hinges below, and is fastened to the window with hooks. Over the tops of both is a wire-cloth screen, to prevent books or lunch remnants from coming in contact with the water.

the correct ones for the welfare of the collection and convenience of study, as well as for ornament.

In the tank represented, each end is formed of one solid plate of cast iron; against these the upper and lower bars that form the front and rear of the tank are fastened. These ends are lined with ordinary glass. The bottom consists of rough (rolled) plate glass  $\frac{1}{4}$  inch thick, and the front and rear of the best double thick French or English glass. It is not necessary, however, that the ends should be of one solid



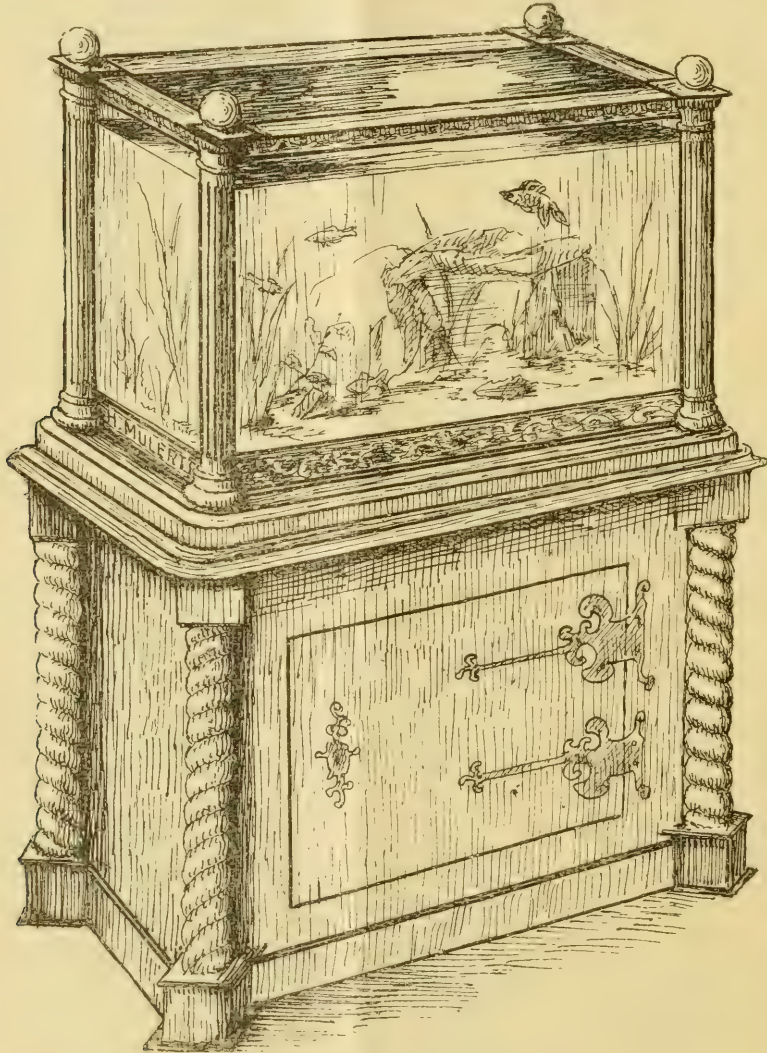
# WINDOW SILL · AQUARIUM ·



THE AQUARIUM, APRIL, 1895.

piece of cast iron; the tank may be made of angle iron after the same principle described in the article referred to above. All that would be necessary in such a case would be to give the

(No. 12) is bent into shape of a capital letter U; each end is then bent to form a little hook, and after this the whole is bent in the middle to form a right-angled bracket. When this support



PARLOR AQUARIUM.

outside of the end-glass two or more coats of paint.

The two brackets, seen on the right and left of the tank, are to imitate the banks or borders of a brook. To form such a bank, a strong galvanized wire

has been shaped to fit snugly (the hooks nicely over the edges of the ends and the wires running alongside the corners of the tank), a piece of ordinary glass about four inches wide and as long as the tank is wide, is placed upon



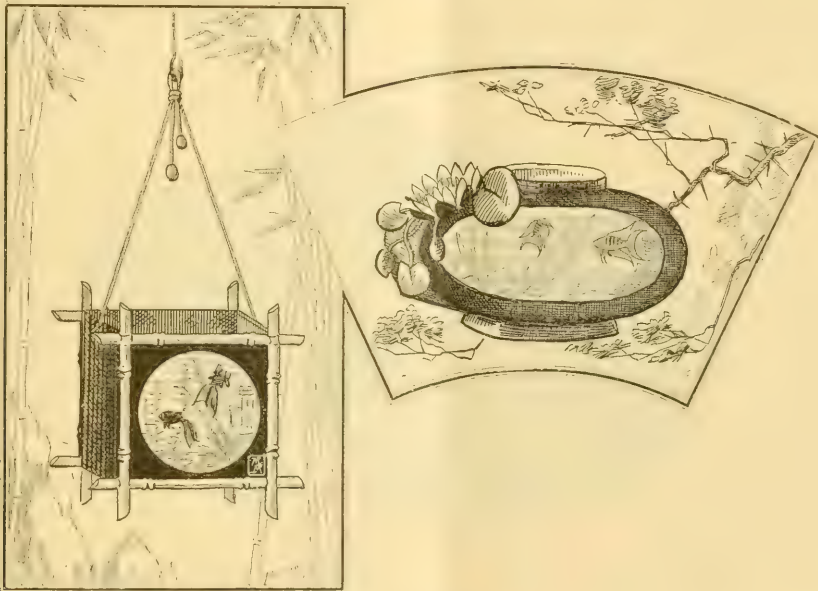
it, and the brackets are ready to receive the plants intended for the decoration of the embankment.

Small specimens of the following are the most suitable and most easily obtained : Umbrella grass (*Cyperus alternifolius*), No. 1 ; small growing Iris ; dwarf Bamboo, No. 4 ; young specimens of Sword fern (*Nephrolepis exaltata*), No. 3 ; dwarf Callas (Little Gem) ;

As may be seen in the illustration, the water of the aquarium should reach just below the glass brackets.

Such a tank has all the advantages of a parlor aquarium and the development of the tadpole to the frog may be better observed in it than in any other.

The submerged plants shown in the illustration are : Horn or Waxwort (*Ceratophyllum demersum*), No. 9 ;



CABINET AQUARIUM.

*Farfugium grande*; Arrowhead (*Sagittaria sinensis*), No. 5 ; creeping Fig (*Ficus repens*), No. 2, and others. But these artificial banks may as well be filled with native plants found in the woods or alongside of any creek or lake.

For the purpose of putting these plants in position, the glass plates upon which they are to rest, are taken from the brackets and the plants are tied with strong string or fine copper wire on top of them, using plenty of green moss to imbed them in, after which they are put back in their places.

*Ludwigia Mulettii*, No. 10 ; Rosy fanwort (*Cabomba rosæfolia*), No. 11 ; Floating Arrowhead (*Sagittaria natans*), No. 8 ; Canal pest (*Anacharis canadensis*), No. 12 ; Water hyacinth (*Eichhornia crassipes*), No. 6 ; *Salvinia natans*, No. 7.

Of animal life there is represented : Frog tadpoles in different stages of development, No. 19 ; Newts, No. 18 ; Fantail goldfish, No. 14 ; Comet goldfish, No. 15 ; Goldorfe, No. 16 ; Tench, No. 17, and a ram's-horn snail, by Fig. 20.

## THE BRAZILIAN ZEBRA FISH.

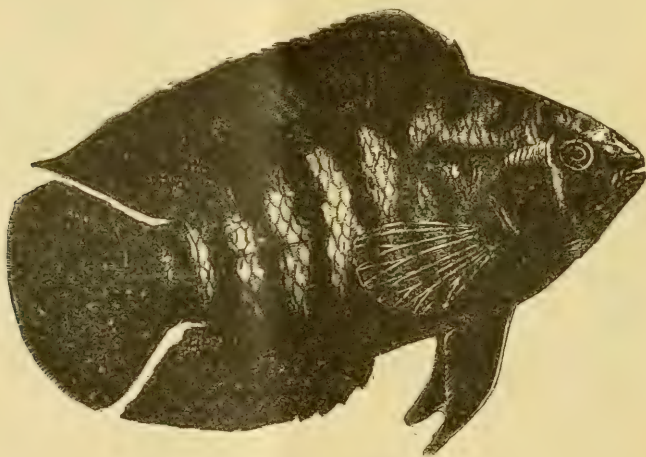
*(Heros facetus.)*

This new aquarium fish was first brought to Germany by an enthusiast a year ago, and was successfully propagated last summer. We saw the original imported fish with their fry. Our picture is a good representation; we reproduced it from *Natur und Haus*.

The fish attains a size of about five inches in length by two inches in width. The general appearance of the fish is that of a sunfish; the ground color of

ing like fire on some occasions, resembling those of the moss bass.

The fish is very attractive, especially when excited; it reminds one of a herald of the middle ages, whose dress used to display the colors of their masters in stripes. At other times the fish will assume a very plain grayish color, with only one irregular black spot on each side of the body, midway and near the ends of the dorsal and anal fins. Young specimens show these peculiar markings even more distinct than the adults.



THE BRAZILIAN ZEBRA FISH.

the body, which is entirely covered with small scales similar in size to those of the Paradise fish, is a brassy yellow marked with a number of irregular vertical bars or stripes of black; the dorsal and anal fins are large and long, being composed of a great many rays, of which about two-thirds are spinous; they are black in color; at times, however, when the fish is excited, the yellow of the body becomes brighter and runs in streaks into the black dorsal fin, making this appear as if it was a continuation of the body; the ventral fin is colorless and transparent; the caudal fin is rounded. The eyes are yellow, flash-

The habits of the Zebra fish are very much like those of our Moss bass; they are very pugnacious and display the same motions when attacking one another as the Moss bass does, but their point of attack is the mouth, which, if they succeed in grasping, they hold firmly, much like fighting male Paradise fish do, until the weaker one gives up. But although they fight a great deal, we have not yet seen one that was seriously hurt; they seem to be on friendly terms again soon after.

Their breeding habits, too, are much like those of the sunfish family. They "pair off" during the summer and pre-



pare a nest on the bottom of the tank, where the female deposits her eggs, which both guard. Four days after spawning the young hatch. These are as carefully guarded as the eggs were, and later on they are instructed for their future career by both parents, who swim about with them, as a hen walks around with her chicks. We find that the Zebra fish stand captivity well, enjoying their meals, which consists of scraped raw beef or I.X.L. fish food, immensely.

Their native home is the La Plata valley; the South Americans call them "Chanchitos," which means "pig," either because their shape is somewhat like that animal or because they fight in a similar manner to that of young pigs. In Germany the name "chameleon fish" is proposed, owing to the ability of the fish to change its colors. This, however, we consider no denominative feature, as nearly all of our sunfish and also the Chinese Paradise fish possess this ability, in some cases even to a greater extent than the Zebra fish does. We selected the latter name for them, because we find that through their color and stripes this fish resembles a zebra more than anything else, especially when the fish are most brilliant in colors and the yellow appears in the dorsal fin; even the markings of the mane of the zebra are then represented.

Palms should never be allowed to get dry; in fact, in the summer they should stand in a saucer of water, whence the roots will take up their supply as they want it. Keep the foliage free from dust and wash them once in a while with a sponge and tepid water. They do not want any sun, but plenty of light; they are sure to die in parlors where all the blinds are closed.

## Drift-Wood.

The beautiful North German Lloyd steamer "Elbe," that sunk in the North Sea on the 30th of January, taking three hundred and thirty-five people to the bottom of the sea, was greatly identified with the fish culture and especially the aquarium business of this country and Germany. Several years ago, when we brought the beautiful Chinese Paradise fish and the Japanese telescope fish to this country, it was our good fortune to cross the Atlantic as one of her passengers. Before and after this trip she carried novelties in the fish line. When she was running on the line between Bremen and Chinese ports, she brought tropical fish to Germany, Russia and England. While on the New York line she carried on nearly every trip European species to this port and American fish to the German shore.

Her officers and crew, as far as they came in contact with "live cargo," were great friends of animals, and shipments of live fish or amphibians had always the best of care when aboard of the "Elbe." The crew were very fond of her. They would say, when remarks were made regarding her speed: "She knows her way in the dark, and would find the port of New York all by herself." On her last successful trip, last December, she brought us the first young Brazilian zebra fish, of which a description is given elsewhere in this issue.

### WHAT'S IN A NAME?

We were taking a small can of choice Japanese goldfish to one of the aristocratic residences up-town in New York city, the other day, and used the Broadway surface car. As the weather was

rather cold we were compelled to bring the can, for the fishes' sake, inside of the car. The can, a three-gallon one, was barely placed, when several gentlemen objected to having a passenger car turned into a freight car. They wanted the can on the front platform again, and called for the conductor to have it removed. "What's in that can; anyhow?" he asked. "Live trout," was our reply. You ought to have seen what a change in the countenances of the objecting parties this reply produced! "What kind are they?" was asked by two or three at once, and we called our "Japs" "speckled brook trout," for a change. This was sufficient; two gentlemen moved closer together on the seat to make room for the can of "trout" near them, and now every one in our part of the car talked "fish." One elderly gentleman, however, remarked as he left the car, pretty near our destination, that, in his opinion, fish did not "belong in a passenger car, trout or no trout;" to which the other passengers had only a pitiful look that said: "Your education has certainly been neglected, as far as trout fishing is concerned."

#### HOTBEDS MADE BY ANTS.

In the State of Colombia there is a large ant (*atto cephalotes*) which causes a great deal of injury to plantations. It attacks and carries off indiscriminately all kinds of foliage, and no sort of vegetation seems to come amiss to it. The quantity of foliage carried off by these ants is immense; in quality it may be bitter, sweet, pungent, tender, or tough. Her Britannic Majesty's Acting Consul, at Medellin, United States of Colombia, was led to mark carefully the uses to which the ants put

this mass of vegetable matter which they convey to their nests, and he ascertained that they employ it to make hotbeds, upon which their eggs are deposited to be hatched by the heat produced by the fermentation of the leaves. The ants do not eat these portions for food, and the larvæ are fed upon a carefully selected diet. Once the brood is hatched, the ants clear away the hotbed, carrying out of their nest all the decomposed vegetable matter. This is thrown out in heaps apart, and in the large ant hills these heaps will contain bushels and upward. Many efforts have been made to exterminate these ants, at least in the vicinity of farms or gardens; but where the nests occur in plantings or in uncultivated grounds, all attempts have failed. Our consul, Mr. R. B. White, however, believes that he has discovered an efficacious remedy, and it was shown to him by a negro. When a plantation or garden is attacked, all one has to do is to procure a quantity of the *debris* from the hotbeds thrown out of an ant hill entirely unconnected with that from which the invading ants proceed. Scatter this around the beds and on the ant roads, and the effect is marvelous. The ants seem seized with a panic; they drop their burdens instantly; the word seems passed along the roads, and empty-handed the whole of the invading army hurries off to its own nest. They will not return to the same place for many days, and even when they do they avoid all spots in which traces of this, to them, offensive matter remains. The smallest quantity will suffice and a bushel will defend acres of ground. Mr. White, in a letter to the Secretary of the Zoological Society of London, which is published in full in this society's proceedings, declares that he



has seen this plan tried repeatedly, and it has never failed. The biggest army of ants—pioneers, engineers, directors general, all—is utterly discomfited by this very simple means of defense. This plan is not generally known, even in the State of Antioquia (where these ants abound) and he thinks that our colorists might profitably be made acquainted with it.



For the small sum of fifty cents in advance, which pays for a year's subscription to *THE AQUARIUM*, you are entitled to ask information on any point regarding the aquarium or the window garden. We offer no other premium to our subscribers than that of putting our 25 years of practical experience in these branches at their disposal. Ask as many questions as you please, but please to enclose postage for reply. All questions are answered by mail, and we publish only such in these columns as are of general interest.

Will correspondents of this department please co-operate with us by reporting to the Editor the results obtained from advice given in these columns? Such information would be a great benefit to others in want of similar information.

Mrs. J. B. P.—Your aquarium gets, apparently, too much light. Empty it, clean it, then place it so that it gets sufficient light to encourage the growth of the plants, but no sunshine; then replace the plants and re-fill it with water, adding a pinch of ordinary cooking salt to every three gallons of the water.

To remove the green from the glass sides of an empty aquarium, use nothing else but ordinary salt and your moistened hand.

If your aquarium is exposed to a strong light, it will be necessary to shade the side facing the window with a dark screen; blue paper will answer well, while the sun is shining.

The best location for an aquarium is a northern exposure, next best is an eastern, then a southern, while the least good is one facing west.

Mrs. S.—A sprig of plant as you describe is properly called a cutting. It will grow if properly treated. Tadpoles can be had at all times of the year.

J. R. F.—The cause of your fish remaining near the surface most of the time and breathing atmospheric air, is want of oxygen. You have either too many or too large sized fish in your aquarium, and insufficient plant life to supply them the necessary oxygen, or the position of your aquarium is not favorable for the growth of the plants. The best plan for you is to start the aquarium anew. Take out everything, the sand, too; return the latter after a thorough washing, re-plant only the best plants, adding some new ones if it appears necessary; fill it up with water, adding a pinch of table salt. The aquarium should be so located that it will receive a strong light, but no direct sunlight. Should it be so located that the sun will shine upon the glass sides at certain hours of the day, the side that faces the sun should be shaded with a curtain, or a newspaper may be pinned before it. In two or three days the plants will begin to act on the water. This will at first assume an opal (somewhat cloudy) appearance, but after a couple of days this will disappear, leaving the water as clear and sparkling as crystal. Now introduce a few tadpoles, ram's-horn snails and a few fish. If you find that the fish do well and the plants show signs of growth, you may cautiously add one or two more fish. This you may do from time to time, until you will find that you have reached the limit of your aquarium. In selecting stock, aim for quality, not for quantity, and don't hurry anything! Remember that you do it for recreation, to rest your nerves, so to speak, and all haste should therefore be avoided, for your own sake as well as for the welfare of your collection.

You should feed your fish regularly every day, being careful that all unconsumed food is at once removed after meal time. Newts (the name lizard is a misnomer) are good companions for goldfish; eels, however, are not.

O. L.—Your letter is not quite plain. If the caudal fin is broken lengthwise, you may leave it as it is; nature will soon mend it again; but if the fin is broken crosswise, it will be best to cut it off with a sharp knife. The fish should be kept by himself after the operation in order to prevent his companions from nibbling at the wounded part. After the wound has healed, which will be in about a week, it may be returned to the collection.

J. H. H.—Artificial sea-water is preferred by many to natural sea-water for a marine aquarium. We have used it for years with success, too.

C. A. S.—The brown tips on your *Sagittaria* must not worry you. What you call brown is very likely what we know as purplish red. This is a peculiarity of the variety New Era. Sometimes entire blades of this plant turn purplish carmine, thus making a very beautiful effect. Your aquarium is evidently in a very strong light. We would not give it a stronger light, at any rate.

Mr. L. K.—An examination of the golden tench you sent us disclosed the fact that it was choked to death by a piece of meat which was located in its throat. In feeding fish with scraped raw meat one should be very careful not to give too large portions. Bigger pieces that are intended for the larger fish will sometimes be gobbled up by the smaller fish, and in such case they may prove fatal, as in the case of your tench. It is safest to give equally small-sized bits of food to all fish, inasmuch as the quantity may be increased by increasing the numbers of pieces fed to each individual.

S. R., N. Y.—Paradise fish will not do well in running water. They prefer standing water; the older the water the better it is for them. Changing the water of an aquarium to which Paradise fish were accustomed quite frequently causes their death. All the varieties of goldfish will live

in running water, but they thrive best in standing water, of which the temperature should not be lower than 55 degrees F., nor higher than 110 degrees F. All other fancy fish, if tropical, prefer standing water, this preference being the main reason why they are so well adapted for parlor aquariums.

Mr. F., Bowling Green.—The cause of your fish coming to the surface of the water to breathe is lack of oxygen in the water. Your tank may be unfavorably located, and therefore the aquatic plants are not able to keep the right balance. Or your aquarium may be overstocked, or you overfeed your fish and pay too little attention to the food remnants. Give your tank a strong light, but no sun, to encourage the growth of the plants; feed your fish only once a day, and not more than they will actually eat at once, allowing no remnants to remain on the bottom, and your collection will keep in good health. Please report what success you have and oblige the Editor.

Dr. W.—We are informed that up to date \$250,000 have been spent to turn Castle Garden into an Aquarium. With the site and the building already on hand, a quarter of a million dollars is a great deal of money even for America to spend on an institution of this kind, but we are afraid it will take a good deal more money and time before the New York Aquarium is in fair running order, leaving aside the grand idea of showing the world a model public aquarium, the realization of which seems now lost—at the best, it is postponed for years.

F. M., N. O.—Snow or snow-water is very injurious to fish. In ponds that are fed by springs it does not matter much, but in skyponds snow often causes what is called an "uprising" (riot) of the fish. (Because they come to the surface and act very restless and curious, caused by unfit conditions of the water.)

The remedy in such a case is, to remove the fish at once from the pond and place them in running water. You may feed your sick fish on chopped salted Dutch herring roe and start a steady current of water through your pond. This may restore them to health, although the disease appears to be very much advanced.



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